ESE 123   Introduction to Electrical and Computer Engineering
Spring 2019

2010-2011 Catalog Description: Introduces basic electrical and computer engineering concepts in a dual approach that includes: laboratories for hands-on wired and computer simulation experiments in analog and logic circuits, and lectures providing concepts and theory relevant to the laboratories. Emphasizes physical insight and applications rather than theory.

Course Designation: Required

Text Books: None

Prerequisites: Pre- or corequisites: AMS 151 or MAT 125 or 131 or 141; PHY 125 or 131 or 141

Coordinator: David Westerfeld

Goals: The primary purpose of this course is to give students a taste of electrical engineering principles and practices early on in their educational career.

Course Learning Outcomes: Students should be able to:
1. Analyze simple circuits using Kirchhoff's laws
2. Demonstrate proficiency in the use of electrical test equipment
3. Demonstrate circuit assembly techniques (soldering printed circuit boards)
4. Utilize computer simulation tools to model circuits
5. Describe how the example circuits work and be able to calculate component values
6. Effectively document experimental results with written laboratory reports
7. Perform some simple assembly language programming

Topics Covered:

Week 1.	Engineering careers, Engineering units: voltage, current, and power
Week 2.	Conductors, insulators, semiconductors, resistance, and grounding
Week 3.	Power supply, Ohm's law, lab safety, Kirchoff's laws
Week 4.	Series and parallel circuits, digital multimeter operation
Week 5.	Circuit construction techniques, PSpice
Week 6.	Periodic signals, function generator, oscilloscope
Week 7.	Transformer, exam review, midterm exam #1

Week 8.	Diodes, rectifier circuits, capacitors, soldering
Week 9.	Linear regulator, transistors, and current limiter
Week 10.	Number formats, microcontroller, assembler
Week 11.	Digital inputs, piezoelectric buzzer, exam review, midterm exam #2
Week 12.	LED driver circuits, microcontroller jump and branch instructions
Week 13.	Microcontroller recap, LED multiplex circuits, Moore's law
Week 14	Entrepreneurship (class visitor), final review

Class/laboratory Schedule: Lecture: 1hr 20min/2 days per week
Lab: 3 hr/1 day per week

Program Outcomes	% contribution*
❑ (a) an ability to apply knowledge of mathematics, science and engineering	20
❑ (b1) an ability to design and conduct experiments	20
❑ (b2) an ability to analyze and interpret data	10
❑ (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
❑ (d) an ability to function on multi-disciplinary teams	
❑ (e) an ability to identify, formulate, and solve engineering problems	
❑ (f) an understanding of professional and ethical responsibility	
❑ (g) an ability to communicate effectively	20
❑ (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
❑ (i) a recognition of the need for, and an ability to engage in life-long learning	
❑ (j) a knowledge of contemporary issues	
❑ (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	30
❑ Any other outcomes and assessments?	

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